GROUNDWATER BASIN AND SUB-BASIN DESIGNATIONS

Pursuant to A.R.S. § 45-404 the Director of the Department of Water Resources has designated forty-six (46) groundwater basins and 9 of which contain a total of twenty-seven (27) sub-basins which are not included within the state's four initial active management areas. As set forth in the Director's Order the boundaries of the basins and sub-basins are described in the materials accompanying this document. These boundary descriptions include the following:

(1) Table 1 setting forth an alphabetical listing of each of the groundwater basins located within the state together with the sub-basins located therein and the counties in which such basins lie; and Table 2 setting forth a listing of each of the counties and the basins and sub-basins located within those counties.

(2) A written description of each basin and sub-basin together with the basic factual findings relating to each.

(3) A map depicting all of the basins and sub-basins located within the state.

(4) A series of 23 maps depicting the boundaries of the state's basins and sub-basins together with a description of each of the boundaries depicted.

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A. Table 1 - Alphabetical Listing of Basins

Basin	Sub-Basins Within Basin	Location by County
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2. Aravaipa Canyon (ARA)		Graham Pinal
3. Big Sandy (BIS)	Fort Rock (FOR) Wikieup (WIK)	Mohave Yavapai
4. Bill Williams (BWM)	Alamo Reservoir (ALM) Burro Creek (BUR) Clara Peak (CPK) Santa Maria (SAM) Skull Valley (SKL)	Mohave Yavapai La Paz
5. Bonita Creek (BNA)		Graham
6. Butler Valley (BUT)		La Paz
7. Cienega Creek (CCR)		Cochise Pima Santa Cruz
8. Coconino Plateau (COP)		Coconino Mohave
9. Detrital Valley (DET)		Mohave
10. Donnelly Wash (DON)		Pinal
11. Douglas (DOU)		Cochise
12. Dripping Spring Wash (DSW)		Gila Graham Pinal
13. Duncan Valley (DUN)		Cochise Graham Greenlee
14. Gila Bend (GIL)		Maricopa
15. Grand Wash (GWA)		Mohave
16. Harquahala (HAR)		Maricopa La Paz
17. Hualapai Valley (HUA)		Mohave

Basin	Sub-Basins Within Basin	Location by County
18. Kanab Plateau (KAN)		Coconino Mohave
19. Lake Havasu (LAH)		Mohave
20. Lake Mohave (LMV)		Mohave
21. Little Colorado River Plateau (LCR)		Apache Coconino Navajo
22. Lower Gila (LGL)	Childs Valley (CHV) Dendora Valley (DDV) Wellton-Mohawk (WEL)	Maricopa Pima Yuma La Paz
23. Lower San Pedro (LSP)	Camp Grant Wash (CGW) Mammoth (MAM)	Cochise Gila Graham Pima Pinal
24. McMullen Valley (MMU)		Maricopa Yavapai La Paz
25. Meadview (MED)		Mohave
26. Morenci (MOR)		Apache Graham Greenlee
27. Parker (PAR)	Cibola Valley (CBV) Colorado River Indian Reservation (CIR) La Posa Plains (LAP)	La Paz Yuma
28. Paria (PAI)		Coconino
29. Peach Springs (PSC)		Coconino Mohave Yavapai
30. Ranegras Plain (RAN)		La Paz Yuma
31. Sacramento Valley (SAC)		Mohave

Basin	Sub-Basins Within Basin	Location by County
32. Safford (SAF)	Gila Valley (GVA) San Carlos Valley (SCR) San Simon Valley (SSI)	Cochise Gila Graham Greenlee Pinal
33. Salt River (SAR)	Black River (BLR) Salt River Canyon (SCA) Salt River Lakes (SLK) White River (WHR)	Apache Gila Graham Greenlee Maricopa Navajo Pinal
34. San Bernardino Valley (SBV)		Cochise
35. San Rafael (RAF)		Cochise Santa Cruz
36. San Simon Wash (SSW)		Maricopa Pima
37. Shivwits Plateau (SHV)		Mohave
38. Tiger Wash (TIG)		Maricopa
39. Tonto Creek (TON)		Gila
40. Upper Hassayampa (UHS)		Maricopa Yavapai
41. Upper San Pedro (USP)	Allen Flat (ALF) Sierra Vista (SVS)	Cochise Graham Pima Santa Cruz
42. Verde River (VER)	Big Chino (BIC) Verde Canyon (VCA) Verde Valley (VVA)	Coconino Gila Maricopa Yavapai
43. Virgin River (VRG)		Mohave
44. Western Mexican Drainage (WMD)		Pima Yuma
45. Willcox (WIL)		Cochise Graham
46. Yuma (YUM)		Yuma

B. Table 2 - Listing of Basins by County Location

Located Partially or Wholly Within County

County	Basin	Sub-Basin
Apache	Little Colorado River Plateau	
	Morenci	
	Salt River	Black River
		White River
Cochise	Cienega Creek	
	Douglas	
	Duncan Valley	
	Lower San Pedro	Mammoth
	Safford	San Simon Valley
	San Bernardino	
	San Rafael Valley	
	Upper San Pedro	Allen Flat
		Sierra Vista
	Willcox	
Coconino	Coconino Plateau	
	Kanab Plateau	
	Little Colorado River Plateau	
	Paria	
	Peach Springs	
	Verde River	Big Chino
		Verde Valley
Gila	Dripping Spring Wash	
	Lower San Pedro	Mammoth
	Safford	San Carlos Valley
	Salt River	Black River
		Salt River Canyon
		Salt River Lakes
		White River
	Tonto Creek	
	Verde River	Verde Canyon
Graham	Aravaipa	
	Bonita Creek	
	Dripping Springs Wash	
	Duncan Valley	
	Lower San Pedro	Mammoth
	Morenci	
	Safford	Gila Valley
		San Carlos Valley
		San Simon Valley
	Salt River	Black River
	Upper San Pedro	Allen Flat
	Willcox	

County	Basin	Sub-Basin
Greenlee	Duncan Valley	
	Little Colorado River Plateau	
	Morenci	
	Safford	
		Gila Valley
		San Simon Valley
	Salt River	Black River
La Paz	Bill Williams	Alamo Reservoir
		Clara Peak
	Butler Valley	
	Harquahala	
	McMullen Valley	
	Ranegras Plain	
	Parker	Gibola Valley
		Colorado River Indian Reservation
		La Posa Plains
	Lake Havasu	
	Lower Gila	
Maricopa	Agua Fria	
	Gila Bend	
	Harquahala Valley	
	Lower Gila River	Childs Valley
		Dendora Valley
		Wellton-Mohawk
	McMullen Valley	
	Salt River	Salt River Lakes
	San Simon Wash	
	Tiger Wash	
	Upper Hassayampa	
	Verde River	Verde Canyon
Mohave	Big Sandy	Wikieup
		Fort Rock
	Bill Williams River	Alamo Reservoir
		Burro Creek
		Clara Peak
		Santa Maria
	Coconino Plateau	
	Detrital Valley	
	Grand Wash	
	Hualapai Valley	
	Kanab Plateau	
	Lake Havasu	
	Lake Mohave	
	Meadview	
	Peach Springs	
	Sacramento Valley	
	Shivwits Plateau	
	Virgin River	

County	Basin	Sub-Basin
Navajo	Little Colorado River Plateau	
	Salt River	Black River
		White River
		Salt River Canyon
Pima	Cienega Creek	
	Lower Gila River	Childs Valley
		Wellton-Mohawk
	Lower San Pedro	Mammoth
	San Simon Wash	
	Upper San Pedro	
	Western Mexican Drainage	
Pinal	Aravaipa Canyon	
	Donnelly Wash	
	Dripping Spring Wash	
	Lower San Pedro	Camp Grant
		Mammoth
	Safford	San Carlos Valley
	Salt River	Salt River Lakes
Santa Cruz	Cienega Creek	
	San Rafael Valley	
	Upper San Pedro	Sierra Vista
Yavapai	Agua Fria	
	Big Sandy	Fork Rock
	Bill Williams	Alamo Reservoir
		Burro Creek
		Santa Maria
		Skull Valley
	McMullen Valley	
	Peach Springs	
	Upper Hassayampa	
	Verde River	Big Chino
		Verde Canyon
		Verde Valley
Yuma	Lower Gila River	Wellton-Mohawk
	Parker	Cibola Valley
		La Posa Plain
	Western Mexican Drainage	
	Yuma	

AGUA FRIA BASIN

Basin Description

The Basin is the surface watershed of the Agua Fria River and its tributaries between Waddell Dam and the Prescott AMA boundary near Humboldt.

Finding

Groundwater occurs in the unconsolidated alluvium along the Agua Fria River and its major tributaries. In the area between Bumble Bee and Orme Ranch, a conglomerate is the main water bearing unit. Other units in the basin that may yield water include: Volcanic clastic and lake bed deposits between Lake Pleasant and the Bradshaw Mountains, volcanic rocks, and fractured areas of the schist, gneiss and granite which form the mountains of the basin. Depths to water range from 0 to 470 feet.

ARAVAIPA BASIN

Basin Description

This basin is the surface watershed of Aravaipa Creek upstream from where Aravaipa Creek enters the San Pedro Valley between Brandenberg and Mining Mountains.

Finding

Groundwater generally occurs in the alluvium along Aravaipa Creek. Depths to water in the alluvium range from 6 to 79 feet. Small amounts of groundwater may be obtained from volcanic rocks and conglomerate in areas of the basin away from Aravaipa Creek.

BIG SANDY BASIN

Fort Rock Sub-Basin
Wikieup Sub-Basin

Basin Description

The basin is the surface watershed area of the Big Sandy River upstream from the ridge lines of the Hualapai and Aquarius Mountains which close off the deep alluvium of the Big Sandy Valley from the area downstream. Also included in this basin is part of the upper Truxton Wash surface watershed. The basin is divided into two sub-basins: Fort Rock Sub-Basin is the watershed of Trout Creek upstream from where the creek has cut through the Aquarius Mountains; and the Wikieup Sub-Basin, which is the remainder of the area and contains the major alluvial aquifers of the basin.

Findings

In the Wikieup Sub-Basin groundwater occurs in a single alluvial aquifer extending over the entire length of the sub-basin. Depth to water ranges from 10 to 660 feet. In the Fort Rock Sub-Basin water is obtained from sedimentary rocks. The extent of the aquifer is not known due to lack of development in the area, but depth to water ranges from 32 to 950 feet. Volcanic rocks in the west of the Fort Rock Sub-Basin yield water in some areas.

Although surface water in Truxton Wash flows into the Hualapai Valley Basin, rock ridges extending from Peacock and Music Mountains preclude any large amounts of groundwater from moving north while thick and relatively wide alluvium is continuous towards the Big Sandy River. Groundwater elevations in wells in the area show that groundwater is moving south.

Additional findings concerning this basin may be found in the findings for the Bill Williams Basin.

BILL WILLIAMS BASIN

Alamo Reservoir Sub-Basin
Burro Creek Sub-Basin
Clara Peak Sub-Basin
Santa Maria Sub-Basin
Skull Valley Sub-Basin

Basin Description

With the exception of the Big Sandy Basin and a small area in the Sacramento Basin, the Bill Williams Basin is the surface watershed area of the Bill Williams River and a small part of the surface drainge area of Centennial Wash north of Aguila. The basin is divided into 5 sub-basins: Clara Peak Sub-Basin is the area downstream from Alamo Dam; Alamo Reservoir Sub-Basin is the drainage area from Alamo Dam to the ridge line of the Date Creek Mountains extended northwestward following the ridge lines of Ives Peak, Arrastra Mountains, and Greenwood Peak; Burro Creek Sub-Basin is the watershed of Burro Creek upstream from the ridge line of Arrastra Mountains and Greenwood Peak extended to the boundary with the Big Sandy Basin, Santa Maria Sub-Basin is the drainage area of the Santa Maria River from the ridge line of the Date Creek Mountains to Arrastra Mountains to the ridge of mountains which provide the boundary with the Skull Valley-Peoples Valley area; and Skull Valley Sub-Basin is the watershed area of Skull Valley Wash upstream of the ridge line of the Weaver Mountains extended northward through Martin and Cornfield Mountains.

Findings

The major source of groundwater in the Bill Williams Basin is alluvial aquifers. These aquifers occur in the valleys of the streams and washes in the basin. Generally, these are narrow and shallow; however, there are some with widths ranging up to several miles and depths up to 1000 feet. Although there are several alluvial aquifers found in the Bill Williams Basin they are not of sufficient size or importance to warrant their distinction as separate basins. Additional sources of water in

the Bill Williams Basin are the consolidated sedimentary rocks. Water in these rocks; however, this is a localized condition. Volcanic rocks are known to contain water in the Skull Valley Sub-Basin, but the extent is not well known.

The surface expression for the Bill Williams Basin has been established according to the predominant conditions for the origin and movement of groundwater in the mountainous areas of Arizona. Groundwater originates in upper watershed areas and moves toward the major stream or watershed outlet and normally does not cross watershed boundaries above the outlet. Sub-basins have been established to distinguish major surface tributaries or tributary areas within the basin.

The Big Sandy Basin distinguishes a distinct alluvial aquifer that is not found to be significantly related to groundwater conditions in the Burro Creek area.

The groundwater body in the basin is not necessarily in hydraulic connection everywhere between sub-basins. In some areas groundwater is non-existent or occurs under very localized conditions. The sub-basins are hydrologically related by the discharge of groundwater to surface streams which travel between sub-basins to the watershed outlet.

BONITA CREEK BASIN

Basin Description

The basin is the surface watershed area of Bonita Creek above the alluvium along the Gila River near the confluence.

Findings

Groundwater occurs in an alluvial aquifer along Bonita Creek. However, the extent of groundwater in the area is unknown.

Boundaries for the Bonita Creek Basin have been established to reflect the predominant conditions for the origin and movement of groundwater in the area. Although a regional aquifer system exists in the area which could allow groundwater flow to cross the watershed boundary, there was not found to be sufficient factual hydrologic information to demonstrate the existence of such a condition in this basin. For this reason surface drainage is the rationale for delineation of this basin.

BUTLER VALLEY BASIN

Basin Description

The basin is the surface watershed area of Cunningham Wash upstream from the rock ridge extending from the Harcuvar Mountains to the Bouse Hills.

Finding

Groundwater occurs in the alluvial deposits of the basin. The deposits may be greater than 1000 feet thick in places. Depth to water varies from 100 to greater than 800 feet, increasing in depth to the northeast.

CIENEGA CREEK BASIN

Basin Description

The Basin lies between the Upper San Pedro Basin and the Tucson Active Management Area. The basin includes the Sonoita Creek Surface watershed upstream from a point approximately three miles southwest of Patagonia and the surface watershed of Pantano Wash upstream from a point about two miles west of Pantano.

Findings

Alluvial deposits of the basin are the major source of groundwater. Depth to water ranges from 0 to 400 feet. The shallowest areas are along Cienega Creek in the north half of the basin with depth to water increasing toward the surrounding mountains.

There appears to be a single principal aquifer, as indicated by depth-of-alluvium maps.

COCONINO PLATEAU BASIN

Basin Description

The basin is defined as the area bounded on the west and north by the Colorado and Little Colorado Rivers, on the east by U.S. Highway 89, and on the south by the Verde River watershed.

Finding

The extent of groundwater in this basin is small. Although the C-multiple regional aquifer system is known to exist in the basin, it generally does not yield much water.

DETRITAL VALLEY BASIN

Basin Description

The basin is the surface watershed area of Detrital Wash which flows north into Lake Mead.

Findings

Groundwater generally occurs in the alluvial deposits of the basin. However, very little data are available because there has been little development of groundwater in the area.

The alluvial aquifers of the area are separated from basins to the east and west by mountains which preclude groundwater movement. There is little or no hydraulic connection to groundwater along the Colorado River below Lake Mead.

DONNELLY WASH BASIN

Basin Description

The basin is the surface watershed drainage into the Gila River from a point approximately one mile below Kelvin downstream to the basin boundary at Ashurst-Hayden Dam.

Finding

Groundwater occurs in the alluvial deposits of the valley and is unrelated to the groundwater body in any other groundwater basin.

DOUGLAS BASIN

Basin Description

The basin is located in southern Sulfur Springs Valley and in the surface watershed area of Whitewater Draw, exclusive of the upper reaches of Leslie Creek and Rucker Canyon. The area extends from the Republic of Mexico north to Pearce.

Findings

The alluvium of Sulfur Springs Valley forms a single aquifer in the Douglas Basin. The alluvium is at least 1600 feet thick in places. Depth to water ranges from 24 to 300 feet, being shallowest along Whitewater Draw in the southern area of the basin.

The basin boundary encorporates the entire Douglas Irrigation Non-Expansion Area.

DRIPPING SPRING WASH BASIN

Basin Description

The basin is defined as the surface watershed drainage to the Gila River from Coolidge Dam downstream to the basin boundary near Christmas, approximately six miles northeast of Winkleman.

Findings

Groundwater in this basin appears to be small in extent, occurring in a few small alluvial aquifers along washes or as independent, localized sources associated with fractured or fissured rock.

The Eastern boundary extends upstream to Coolidge Dam, encompassing a hydrologically similar area.

Groundwater in the basin is not related to groundwater upstream from Coolidge Dam, nor is it related to groundwater further downstream in the Lower San Pedro Basin.

DUNCAN VALLEY BASIN

Basin Description

The basin is the surface watershed area of the Gila River from the New Mexico border downstream to near the confluence with the San Francisco River.

Finding

The alluvial deposits along the river near Duncan form the major aquifer in the area.

GILA BEND BASIN

Basin Description

The Gila Bend Basin is the area defined by the watershed drainage area of the Gila River between Gillespie Dam and Painted Rock Dam, including Quilotosa and Sauceda Washes, and is generally bounded by the Painted Rock Mountains on the west, Sauceda Mountains on the southwest and on the north and east by the Phoenix and Pinal AMA boundaries.

Findings

Groundwater occurs primarily in alluvial deposits throughout the basin. Depth to water in the alluvium ranges from less than 15 feet near Gillespie Dam to greater than 600 feet in the east along Bender Wash.

The western basin boundary passes through rock outcrops located between the Painted Rock and Sauceda Mountains.

GRAND WASH BASIN

Basin Description

The basin is the watershed of Grand Wash and other washes draining to the Colorado River south of the Virgin Mountains between the Nevada state line and the drainage divide and east of the Grand Wash Cliffs.

Finding

Alluvium is restricted to thin layers along stream channels. The estimated groundwater pumping is less than 100 acre feet per year, reflecting the lack of groundwater in the area.

HARQUAHALA BASIN

Basin Description

The basin is the surface watershed area of Centennial Wash from the narrows between the Harquahala and Little Harquahala Mountains downstream to the Phoenix AMA boundary at Mullens Cut, excluding the Tiger Wash watershed. In addition, the basin includes the Hubbard Plain which borders the Harquahala Plains area west of Lone Mountains between the Little Harquahala Mountains and the Eagletail Mountains.

Findings

Groundwater occurs in the alluvial deposits of the valley. Depths to water range from 150 to 660 feet. In the south central part of the basin, fine-grained layers are present in the alluvium and bodies of perched groundwater have formed.

Available data indicates that groundwater beneath the Hubbard Plain probably moves eastward into the Harquahala Plains area.

The alluvium across the central part of the Harquahala Plains is known to consist of the fine-grained material which probably would yield little water to wells and which appears to act as an impediment to groundwater flow from the northwest to the southeast areas of the basin. However, the vertical and areal extent of these clay beds is not well defined and data is insufficient to clearly demonstrate that it will hydrologically separate the aquifer over long periods of time.

HUALAPAI VALLEY BASIN

Basin Description

The basin is the surface watershed area of Hualapai Wash excluding the watershed of Truxton Wash upstream of a boundary formed by the ridge line of the Music and Peacock Mountains.

Finding

The major water-bearing unit is the deep alluvium deposits of the valley. Depths to water vary from 260 to 900 feet.

KANAB PLATEAU

Basin Description

The basin is the area generally bounded on the northeast by the Vermillion Cliffs, or the east and south by the Colorado River, on the west by the Hurricane Cliffs, and on the north by the state boundary line.

Finding

In general groundwater in the area is scarce. The area is underlain by the same rock units which make up the C-aquifer of the Little Colorado River Basin. However, in the Kanab Plateau area these formations rarely yield water. Units of the N-aquifer are present in the northwestern part of the basin, but they too are often dry. Some water is obtained from localized alluvial deposits along streams.

LAKE HAVASU BASIN

Basin Description

The basin is the combined small surface watershed areas of the Mohave Mountains which discharge directly into Lake Havasu, from Parker Dam north to Sacramento Wash near Topock. The adjoining Bill Williams Basin extends to the high water mark of Lake Havasu.

Findings

Most water is obtained from the alluvium of the Colorado River and its tributaries. A few wells obtain water from consolidated sedimentary rocks which underlie the alluvium. Depth to water is generally less than 20 feet, but increases towards the mountains.

The majority of water used in the basin is obtained from the Colorado River.

LAKE MOHAVE BASIN

Basin Description

The basin is the combined surface watershed areas of streams which discharge directly to the Colorado River from the watershed of the Sacramento Wash upstream to the point where Canyon Ridge joins Lake Mead.

Finding

Groundwater use in this basin is small. Most water used in the basin is obtained from the Colorado River.

LITTLE COLORADO RIVER PLATEAU BASIN

Basin Description

The Little Colorado River Plateau Basin is the entire northeastern portion of Arizona-lying north of the Mogollon Rim and east of U. S. Highway 89. The area is generally enclosed by a line beginning on the Colorado River at the Utah-Arizona state line extending eastward along the state line to Four Corners; thence, south along the New Mexico-Arizona state line to the drainage divide between the Gila and Little Colorado River; thence along the drainage divide of the Gila, Salt and Verde Rivers; thence, north along a line which parallels U.S.

Highway 89 to the Colorado River; thence along the river to the state line.

Findings

The basin has been delineated to encompass most of the deep regional aquifer system found in the northeast part of the state. There are several large aquifers of lesser depth found in the basin. These aquifers are composed of many sub-units of geologic origin which have large areal extent. The aquifers are stacked one upon the other so that although there is areal hydraulic continuity within each aquifer nearly everywhere over the basin, there is little vertical hydraulic connection between the different aquifers.

The C-aquifer, whose major geologic unit is the Coconino Sandstone, is present everywhere in the basin. In general wells penetrate this aquifer only in the area along and south of the Little Colorado River. The quality of water in the aquifer is good south of the river except in the St. Johns area and parts of the Holbrook area. Water in the aquifer is of poor quality along and to the north of the Little Colorado River.

The C-aquifer is not developed in certain areas as it lies at considerable depth, except along portions of the eastern boundary. The major aquifers in this area are the N and D aquifers which have as their major units the Navajo and Dakota Sandstones respectively. The N-aquifer has the greater extent and contains water of excellent quality. The D-aquifer is present in the central area and has poor quality water in all but the southern portion of the aquifer.

In addition to the major large aquifers, several smaller aquifers are important sources of water. Sedimentary rocks of cretaceous and tertiary age yield water of good quality. Basaltic rocks are present and can be a source of good quality water.

Alluvial aquifers are present along streams and washes over the entire basin. These are generally developed where they exist, however, they represent a much smaller resource than the deeper aquifers. Quality in the alluvial aquifers can vary greatly over short distances, but is generally good.

LOWER GILA BASIN

Childs Valley Sub-Basin
Dendora Valley Sub-Basin
Wellton-Mohawk Sub-Basin

Basin Description

The basin is the surface watershed area of the Gila River, from Painted Rock Dam to below Dome, plus that portion of the drainage area in the "Valley of the Ajo" area which is tributary to the Republic of Mexico, plus the surface watershed area of tributaries to the Colorado River between McAllister Wash and Laguna Dam. The basin is divided into three sub-basins: Dendora Valley Sub-Basin is that portion of the Gila River watershed between Rocky Point and Painted Rock Dam; Childs Valley Sub-Basin which is the watershed draining into "Valley of the Ajo", Daniels Arroyo and Childs Valley; the Wellton-Mohawk Sub-Basin which is all of the remaining drainage area of the Gila River downstream from Rocky Point to below Dome, and the area tributary to the Colorado River between McAllister Wash and Laguna Dam.

Findings

The major source of groundwater in the basin is the unconsolidated alluvium along the Gila River and in the valleys between the mountains. Depth to water ranges from about 3 to 15 feet in the Wellton-Mohawk area to greater than 400 feet north of Hyder.

The groundwater body in Dendora Valley is somewhat isolated from the principal basin alluvial aquifer further downstream, therefore justifying establishment of a sub-basin.

Childs Valley has been designated a sub-basin to distinguish the connected but isolated character of the groundwater body.

LOWER SAN PEDRO BASIN

Camp Grant Sub-Basin
Mammoth Sub-Basin

Basin Description

The basin is the surface watershed of the San Pedro River downstream from a location known as "The Narrows" approximately 10 miles north of Benson plus all surface watersheds draining into the Gila River from a point near Christmas, which is approximately six miles northeast of Winkelman, downstream to near Kelvin. The basin is divided into two sub-basins: Camp Grant Sub-Basin is the surface watershed area of Camp Grant Wash beginning at a point approximately two miles upstream from its confluence with the San Pedro River; and Mammoth Sub-Basin is the surface watershed of the San Pedro River downstream from "The Narrows" to its confluence with the Gila River, including the areas that drain into the Gila River from the upstream basin boundary near Christmas to a point about one mile below Kelvin.

Findings

The main aquifer of the Lower San Pedro Basin is the valley alluvium. Groundwater generally occurs under water table conditions. However, artesian conditions exist along the San Pedro from Mammoth south to Redington. Depth to water ranges from flowing to greater than 500 feet. There has been little decline in water levels.

The groundwater aquifer in the Camp Grant Sub-Basin is hydrologically related to the principal aquifer in the Mammoth Sub-Basin but is isolated by the Black Hills. The groundwater aquifer in the Camp Grant Wash area is significant in extent and can be expected to be predominantly hydrologically distinct from other areas of the basin in experiencing effects from groundwater withdrawal.

McMULLEN VALLEY BASIN

Basin Description

The basin is the surface watershed of Centennial Wash from its headwaters to the narrows between the Harquahala and Little Harquahala Mountains.

Findings

Groundwater occurs throughout the alluvial deposits of the valley area. In the central and western part of the valley fine grained lake beds are interbedded with the alluvium. This condition creates some semi-confined sections below lake beds, and some perched water in other areas. Depths to water in the basin range from 70 feet at the "narrows", to greater than 625 feet in the northeast. Pumping of groundwater has caused the water table to decline substantially in the Aguila and Salome-Wenden areas. Groundwater now flows toward these centers of decline.

Although a small hydraulic connection may exist with the downstream Harquahala Basin at the "narrows", it does not appear to connect the two principal basin aquifers. Therefore, a separate basin is established to distinguish the isolated groundwater body present in McMullen Valley.

MEADVIEW BASIN

Basin Description

The basin is the surface watershed area of Grapevine Wash.

Finding

Groundwater in the basin has been developed primarily for domestic purposes. Depths to water in the alluvium vary from a little over 100 feet to over 900 feet. Because there has been

found to be no connection with the groundwater aquifers in Hualapai Valley, the area has been designated a separate basin.

MORENCI BASIN

Basin Description

The basin is described as the combined surface watershed areas of both Eagle Creek and the San Francisco River above their confluences with the Gila River. The eastern boundary is the Arizona - New Mexico State Line.

Findings

Most wells in the basin obtain water from thin narrow alluvial aquifers along the San Francisco and Blue River and Eagle Creek. However, the most productive wells are owned by the mineral industry and obtain water from volcanic aquifers. The extent of aquifers in the sedimentary and volcanic rocks is not well known because of the lack of groundwater development in the area.

The basin was originally proposed as two separate basins - Eagle Creek and San Francisco River. The topographic divide between the two watersheds was the proposed boundary. However, at the February 4, 1983 rehearing, data was presented concerning the volcanic aquifer which extends under both of the above referenced original basins. As a result of this evidence, the original basins have been combined and renamed the Morenci Basin.

PARKER BASIN

Cibola Valley
Colorado River Indian Reservation
La Posa Plains

Basin Description

The basin is the combined surface watersheds of tributaries to the Colorado River between the Bill Williams River and Laguna Dam, excluding the watershed of Bouse Wash above Bouse. The basin is divided into three sub-basins: La Posa Plains Sub-Basin generally lies between Dome Rock Mountains and Plomosa Mountains and extends from Parker Dam south to the drainage divide between Tyson Wash and Indian Wash, excluding the Colorado River Indian Reservation; Colorado River Indian Reservation Sub-Basin is the Indian Reservation; and Cibola Valley Sub-Basin includes the surface watersheds tributary to the Colorado River between the Colorado River Indian Reservation and McAllister Wash.

Findings

Groundwater occurs both along the floodplain of the Colorado River and in an alluvial aquifer system under the La Posa Plains.

The Colorado River Indian Reservation Sub-Basin separates the alluvial aquifer connection between the Cibola and La Posa Plain Sub-Basins.

PARIA BASIN

Basin Description

The basin generally encompasses the area of the Paria Plateau and is bounded on the west and south by the plateau edge, on the southeast by the Vermillion Cliffs, on the east by the Colorado River, and on the north by the state line.

Finding

Most of the groundwater in the area is obtained from the N-aquifer. Depths to water range from 18 to 1500 feet.

PEACH SPRINGS BASIN

Basin Description

The basin is the area defined in part by the surface watershed draining to Aubrey Valley, the upper drainage area of Truxton Wash and most streams draining into the lower Granite Gorge of the Grand Canyon on the Hualpai Indian Reservation. The basin is generally bounded on the east by the Aubrey Cliffs, on the south by a ridge separating the basin from Big Sandy Basin, on the west by the top ridge of the Grand Wash Cliffs, on the north by the Colorado River, Diamond Creek and Robbers Roose Canyon.

Finding

The occurrence of groundwater in the basin is variable. A limestone regional aquifer system appears to underlie most of the basin at considerable depth to water. Alluvial aquifers occur near Truxton Lake in Aubrey Valley, and along some stream channels.

RANEGRAS PLAIN

Basin Description

The basin is the surface watershed of Bouse Wash, excluding Cunningham Wash and the Hubbard Plain.

Finding

Groundwater occurs as a distinct body of groundwater in an alluvial aquifer system under the Ranegras Plain that has limited

connection with groundwater downstream from Bouse in the Parker Basin. Depths to water range from 50 feet in the northwest to 455 feet in the southeast.

SACRAMENTO VALLEY BASIN

Basin Description

The basin is defined as the surface watershed area of Sacramento Wash and several small washes entering the Colorado River downstream, to approximately "The Needles".

Finding

The main groundwater aquifer in the Sacramento Basin is the alluvium of the valley, which is interbedded with volcanic rock units. Some water is obtained from the igneous and metamorphic rocks surrounding the valley. However, these are localized occurrances controlled by fracture zones. Water in the alluvium is at depths ranging from 185 to over 1200 feet.

SAFFORD BASIN

Gila Valley Sub-Basin
San Carlos Valley Sub-Basin
San Simon Valley Sub-Basin

Basin Description

The Safford Basin is the area defined by the surface watershed of the Gila River, including all tributaries, from Coolidge Dam upstream to the Peloncillo Mountains. The basin is divided into three sub-basins: the San Carlos Valley sub-basin is the drainage area from Coolidge Dam to just upstream of Bylas and includes the San Carlos River watershed; the Gila Valley Sub-Basin is the drainage area from near Bylas to the confluence of the San Francisco and Gila Rivers, except for the San Simon Valley Sub-Basin; and the San Simon Valley Sub-Basin, which is

that portion of the San Simon River watershed area in Arizona upstream from the ridge line just north of Willow Springs Wash.

Findings

The principal groundwater aquifer in the Safford Basin lies in the Gila Valley and along the San Simon River. The aquifer is complex in the Gila Valley, with poor quality artisian water existing below the overlying sedimentary deposits. However, the main producing aquifer from San Carlos Reservoir through the Gila Valley and extending up the San Simon River to its headwaters is in continuous hydraulic connection, indicating that a single basin should be designated.

Groundwater conditions in the area show a clear hydraulic connection of groundwater between the San Simon Valley area and the Gila Valley area, indicating they lie in the same basin.

SALT RIVER BASIN

Black River Sub-Basin
Salt River Canyon Sub-Basin
Salt River Lakes Sub-Basin
White River Sub-Basin

Basin Description

The Salt River Basin is the surface watershed area of the Salt River upstream from Stewart Mountain Dam, except for the drainage area of Tonto Creek above the high water level of Roosevelt Lake. Included within the basin are four sub-basins: Salt River Lakes Sub-Basin is the portion of the watershed between Stewart Mountain Dam and Horseshoe Bend on the Salt River above Roosevelt Lake except for the watershed area of Tonto Creek; Salt River Canyon Sub-Basin is the drainage area of the Salt River between Horseshoe Bend and the intersection of the White and Black Rivers; White River Sub-Basin is the watershed of the White River; and Black River Sub-Basin is the watershed of the Black River.

Findings

Groundwater occurs primarily under hard rock conditions except in the vicinity of lower Cherry Creek, around Roosevelt Lake, and in parts of the Salt River Lakes Sub-Basin.

Surface expression for the basin establishes the predominant conditions for the origin and movement of groundwater, i.e., groundwater movement is toward the major streams or watershed outlet and normally does not cross watershed boundaries above the outlet. Tonto Creek is not included within the basin because it is considered to be a major watershed and groundwater conditions in that watershed are somewhat different than those found in the Salt River Basin.

SAN BERNARDINO VALLEY BASIN

Basin Description

Located east of Douglas, the basin is the surface watershed area of Black Draw from the Republic of Mexico north to its headwaters.

Finding

Groundwater occurs in an alluvial aquifer in the valley. Depth to water varies from flowing to more than 900 feet with the shallower levels being in the south of the basin.

SAN RAFAEL VALLEY BASIN

Basin Description

The basin is the surface watersheds of the Santa Cruz and San Pedro Rivers that drain into the Republic of Mexico before returning to the United States.

Findings

The alluvial deposits in the San Rafael Valley form the major groundwater aquifer in the area.

The principal groundwater aquifer in the San Rafael Valley is distinct from the groundwater aquifer in the Sonita/Cienega Creek area, indicating that the San Rafael Valley should not be part of Cienega Creek basin.

SAN SIMON WASH BASIN

Basin Description

The basin is located wholly within the Papago Indian Reservation, and is the surface watershed of San Simon Wash upstream from the Republic of Mexico.

Findings

Available data indicates that groundwater occurs extensively in alluvial aquifers in the valley areas although specific characteristics of the supply are not well known.

SHIVWITS PLATEAU BASIN

Basin Description

The basin is the surface drainage area bounded in the west by the ridge line of the Grand Wash Cliffs extending north over Wolf Hole Mountain; on the north by the state line; on the east by the ridge line of the Hurricane Cliffs; and in the south by the Colorado River. The northern part of the area drains north to join the Virgin River in Utah while the southern part of the area drains to the south into the Colorado River.

Findings

The area has little development and groundwater use is estimated at less than 100 acre feet per year.

The difficulty of acquiring a dependable water supply probably is a large factor in the lack of development. Thin alluvium is found only along stream channels. Yields from rock aquifers tend to be small or non-existent.

TIGER WASH BASIN

Basin Description

The basin is the surface watershed area of Tiger Wash upstream from the narrows between the Harquahala and Big Horn Mountains.

Finding

Groundwater in this area is not well connected to the groundwater body in the Harqualhala Basin. Therefore, it has been designated as a separate basin.

TONTO CREEK BASIN

Basin Description

The basin is the surface watershed area of Tonto Creek above the high water level of Roosevelt Lake.

Finding

Groundwater occurs in several different units within the Tonto Creek Basin. In the areas along Rye and Tonto Creeks, alluvium is the main source of groundwater. Along the Mogollan Rim and the east-central part of the basin, consolidated sedimentary rocks (limestone, shale and sandstone) yield water. Igneous and metamorphic rocks of the Mazatzal and Sierra Ancha Mountains may yield water in weathered or fractured areas.

UPPER HASSAYAMPA BASIN

Basin Description

The basin is the surface watershed area of the Hassayampa River upstream from the Phoenix AMA boundary.

Finding

Groundwater levels in the alluvial deposits upstream from Wagoner are shallow ranging from at or near the surface to about 30 feet. The principal alluvial area is located generally north and west of Wickenburg, where the alluvium is over 1200 feet thick in places and groundwater depths generally vary from about 100 feet to over 1000 feet.

UPPER SAN PEDRO BASIN

Allen Flat Sub-Basin
Sierra Vista Sub-Basin

Basin Description

The basin is the surface watershed of the San Pedro River from the Republic of Mexico downstream to the area referred to as "The Narrows" north of Benson, and in addition, the upper drainage areas of Hot Springs and Kelsey Canyons, which enter the San Pedro River north of "The Narrows". The basin is divided into two sub-basins: Allen Flat Sub-Basin is the upper watersheds of Tres Alamos Wash, Hot Springs and Kelsey Canyons; and Sierra Vista Sub-Basin is the watershed of the San Pedro River upstream from "The Narrows", exclusive of Upper Tres Alamos Wash.

Findings

Groundwater occurs primarily in the alluvium deposits of the valley. In some areas, beds of silt and clay are present in the alluvium, and water beneath the beds may be under artesian

pressure. The two main areas of artesian pressure are between Palommas and Hereford, and between Saint David and Benson. The extents of the artesian areas are not well known. Some declines in groundwater levels have occurred in the basin, with the most severe occurring in the Fort Huachuca-Sierra Vista area. Depths to water in the basin vary from 0 to greater than 600 feet.

Available hydrologic evidence indicates a connection of the groundwater in the Allen Flat area with groundwater in the Upper San Pedro Basin.

VERDE RIVER BASIN

Big Chino Sub-Basin
Verde Canyon Sub-Basin
Verde Valley Sub-Basin

Basin Description

The Verde River Basin is the surface watershed area of the Verde River from Chino Point at the southern end of the Aubrey Cliffs near Seligman downstream to the Phoenix AMA boundary, excluding that part of the watershed within the Prescott AMA. The basin is divided into three sub-basins: the Big Chino Sub-Basin is the portion of the watershed upstream from the ridge line of the Black Hills and Black Mesa; the Verde Valley Sub-Basin is the watershed area upstream from the Fossil Creek watershed to the ridge line of Black Mesa and Black Hills; and the Verde Canyon Sub-Basin is the watershed area from the boundary of the Phoenix AMA, including the watershed of Fossil Creek.

Findings

Groundwater occurs in different types of geologic formations throughout the basin. In the Big Chino Sub-basin, the groundwater aquifer is in alluvial deposits in the valleys and in basalts interbedded in the alluvial deposit. Depths to water range from 0 to 285 feet. Most of the Verde Valley Sub-Basin is underlain by a regional aquifer consisting of several

hydraulically connected formations. The Verde formation overlies the regional aquifer in the Sycamore Creek and Cottonwood Basin areas. Water in the Verde Formation may be under artesian pressure and is often of poor quality. Other producing aquifers in the sub-basin include a shallow alluvial aquifer along the Verde River flooplain and several basalt flows in the same area. Groundwater in the Verde Canyon Sub-Basin is found in alluvium along the Verde River and major tributaries.

Although groundwater occurs in separate aquifers in the Chino Valley, Verde Valley, and Horseshoe Dam areas, groundwater movement is generally downstream or discharged to the Verde River. Therefore the use of groundwater in an upstream area has the potential to effect the water supply in lower areas of the watershed.

There is insufficient factual hydrologic data upon which to delineate the location of the eastern boundary, and therefore the the boundary in this area is based upon the surface watershed divide, which approximates the current groundwater divide.

VIRGIN RIVER BASIN

Basin Description

The basin is the surface watershed area of the Virgin River from the Nevada state line upstream to the Utah state line.

Findings

Groundwater has been developed primarily in the alluvium of the Virgin River. Wells located in hard rock areas produce small yields.

WESTERN MEXICAN DRAINAGE BASIN

Basin Description

The Western Mexican Drainage Basin is the surface watershed area extending from the Cabeza Prieta-Tule Mountains in the west to the Sierra de Santa Rosa of the Ajo Range on the east, and which drains into Mexico.

Finding

Groundwater occurs primarily in valley alluvial aquifers. Although groundwater is not in connection throughout the basin within the United States, no sub-basins were established due to the small size and the lack of groundwater development.

WILLCOX BASIN

Basin Description

The basin is located generally in the northern Sulfur Springs Valley and is the entire surface watershed area that contributes to Willcox Playa, plus the upper watersheds of Leslie Creek and Rucker Canyon that lie east of the Swisshelm Mountains in the Whitewater Draw watershed.

Finding

The main source of groundwater in the basin is the alluvium of the Sulfur Springs Valley. Fine grained lake beds are present in the alluvium, associated with the Willcox Playa. Artesian groundwater conditions exist in the alluvium below and perched groundwater bodies in coarse deposits above the lake beds.

YUMA BASIN

Basin Description

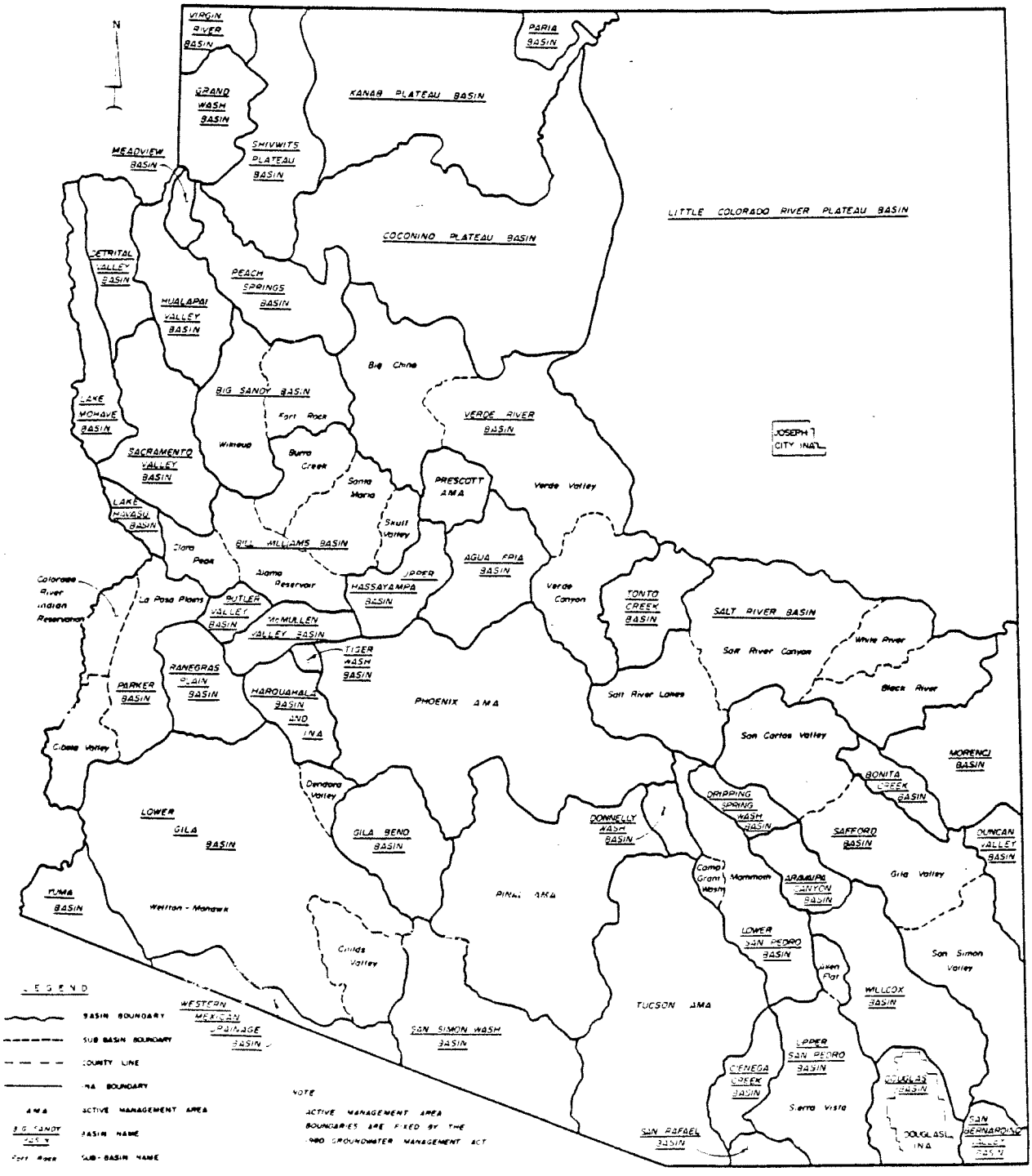
Yuma Basin is located in the extreme southwestern portion of Yuma County, generally bounded by the Colorado River on the west, the Gila Mountains and Tinajas Altas Mountains on the east and the Mexican border to the south.

Findings

Groundwater occurs in the alluvial deposits of the valley. Depth to water is less than 50 feet along the north and west boundaries of the basin. In these areas, groundwater may be so shallow that draining of the soil is necessary. To the south and east depths to water increase and are close to 400 feet along the southern boundary toward the Tinajas Altas Mountains.

The groundwater aquifer at the boundary between the two basins near Dome is relatively narrow, restricting the movement of water from one basin to the other. Also, the major aquifers in the Yuma Basin occur under the floodplain of the Colorado River and under Yuma Mesa, both of which derive their supply from Colorado River water.

ARIZONA DEPARTMENT OF
WATER RESOURCES

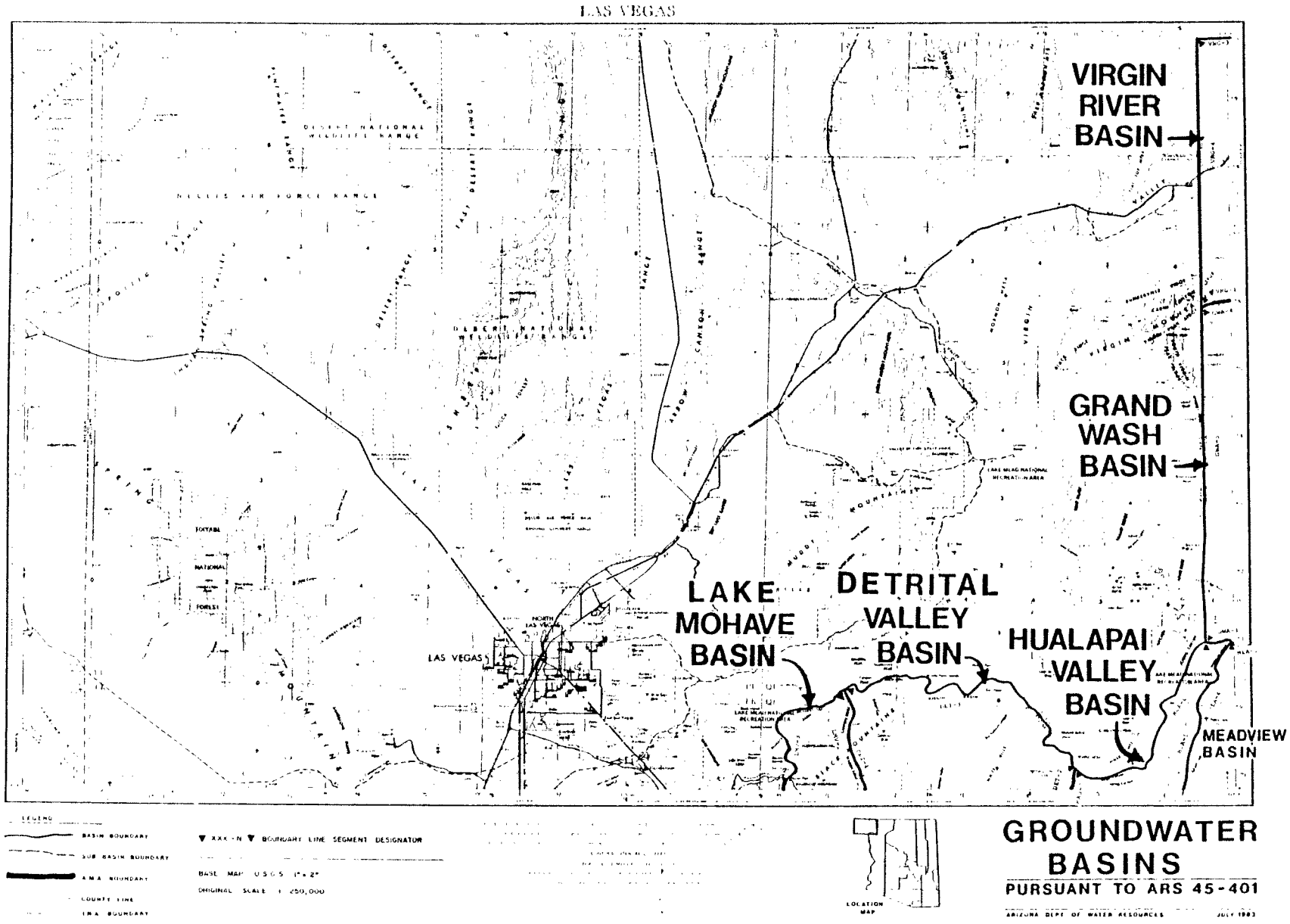


GROUNDWATER BASINS

GROUNDWATER BASIN MAPS

The locations of groundwater basins and sub-basins depicted on the preceeding statewide map are shown in greater detail on the following maps, which sub-divide the state into twenty-three separate areas. The area of the state represented by each map is shown in the lower right portion of the map. The maps are arranged in rows across the state ordered within each row from west to east and with the rows ordered from north to south.

Different widths and types of lines are used to distinguish basins, sub-basins, county lines, Active Management Areas and Irrigation Non-Expansion Areas. In addition there are small line segment designations shown along each basin and sub-basin boundary line. These designations reference detailed descriptions of the actual location of boundary lines between two arrows defining the length of each segment. These detailed boundary line descriptions follow the twenty-three groundwater basin maps.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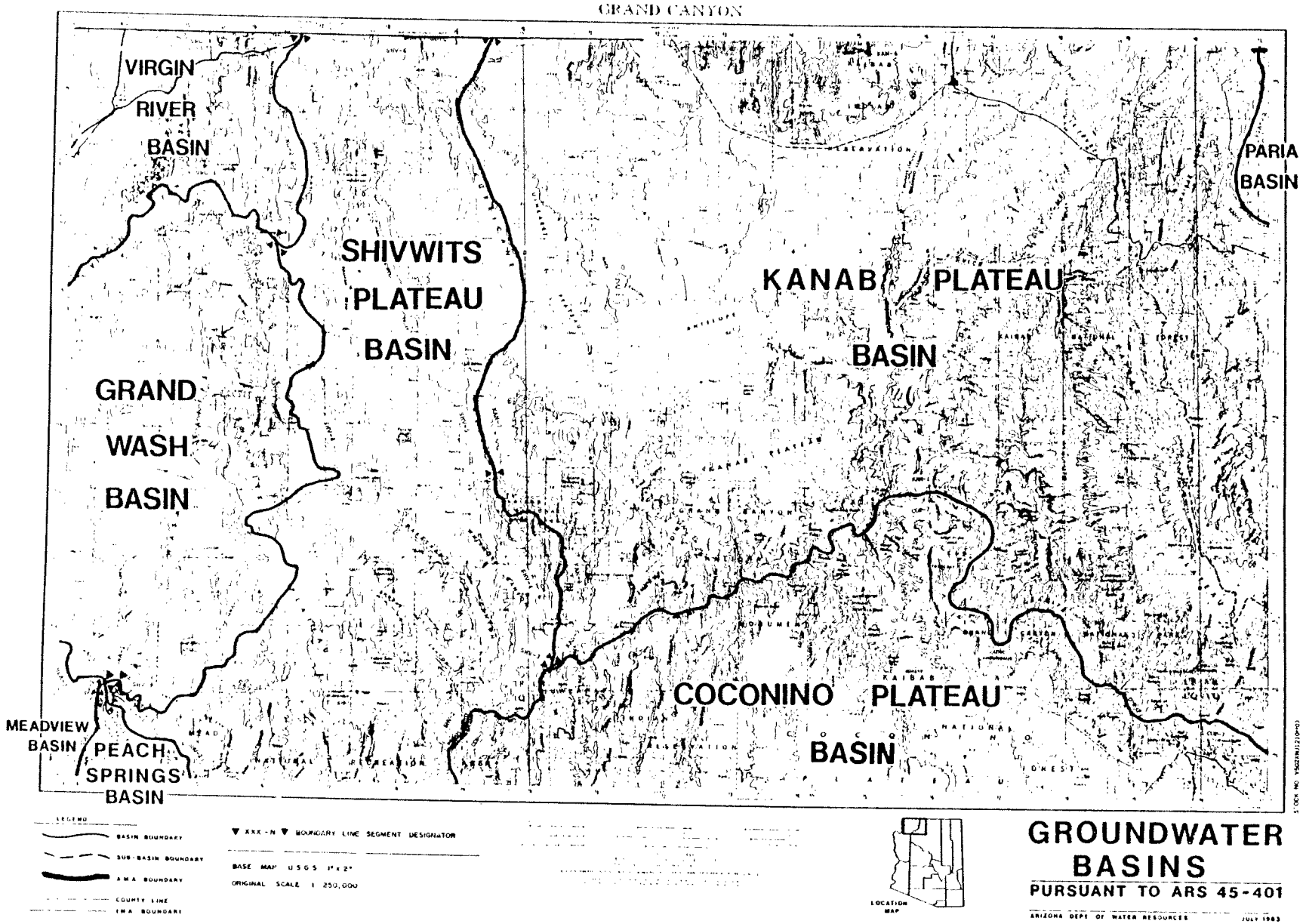
GRAND WASH BASIN
LAKE MOHAVE BASIN
DETRITAL VALLEY BASIN
HUALAPAI VALLEY BASIN
MEADVIEW BASIN
LAS VEGAS
NELLIS AIR FORCE RANGE
DESERT NATIONAL WILDLIFE RANGE
LEGEND
BASIN BOUNDARY
SUB BASIN BOUNDARY
A.M.A. BOUNDARY
COUNTY LINE
I.R.A. BOUNDARY
▼ XXX-N ▼ BOUNDARY LINE SEGMENT DESIGNATOR
BASE MAP: U.S.G.S. 1° x 2°
ORIGINAL SCALE 1:250,000
LOCATION MAP
GROUNDWATER BASINS
PURSUANT TO ARS 45-401
ARIZONA DEPT. OF WATER RESOURCES
JULY 1983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VIRGIN RIVER BASIN
SHIVWITS PLATEAU BASIN
KANAB PLATEAU BASIN
PARIA BASIN
GRAND WASH BASIN
MEADVIEW BASIN
PEACH SPRINGS BASIN
COCONINO PLATEAU BASIN
LEGEND
BASIN BOUNDARY
SUB-BASIN BOUNDARY
AMA BOUNDARY
COUNTY LINE
IMA BOUNDARY
▼ XXX-N ▼ BOUNDARY LINE SEGMENT DESIGNATOR
BASE MAP USGS 1° x 2°
ORIGINAL SCALE 1 250,000
LOCATION MAP
GROUNDWATER BASINS
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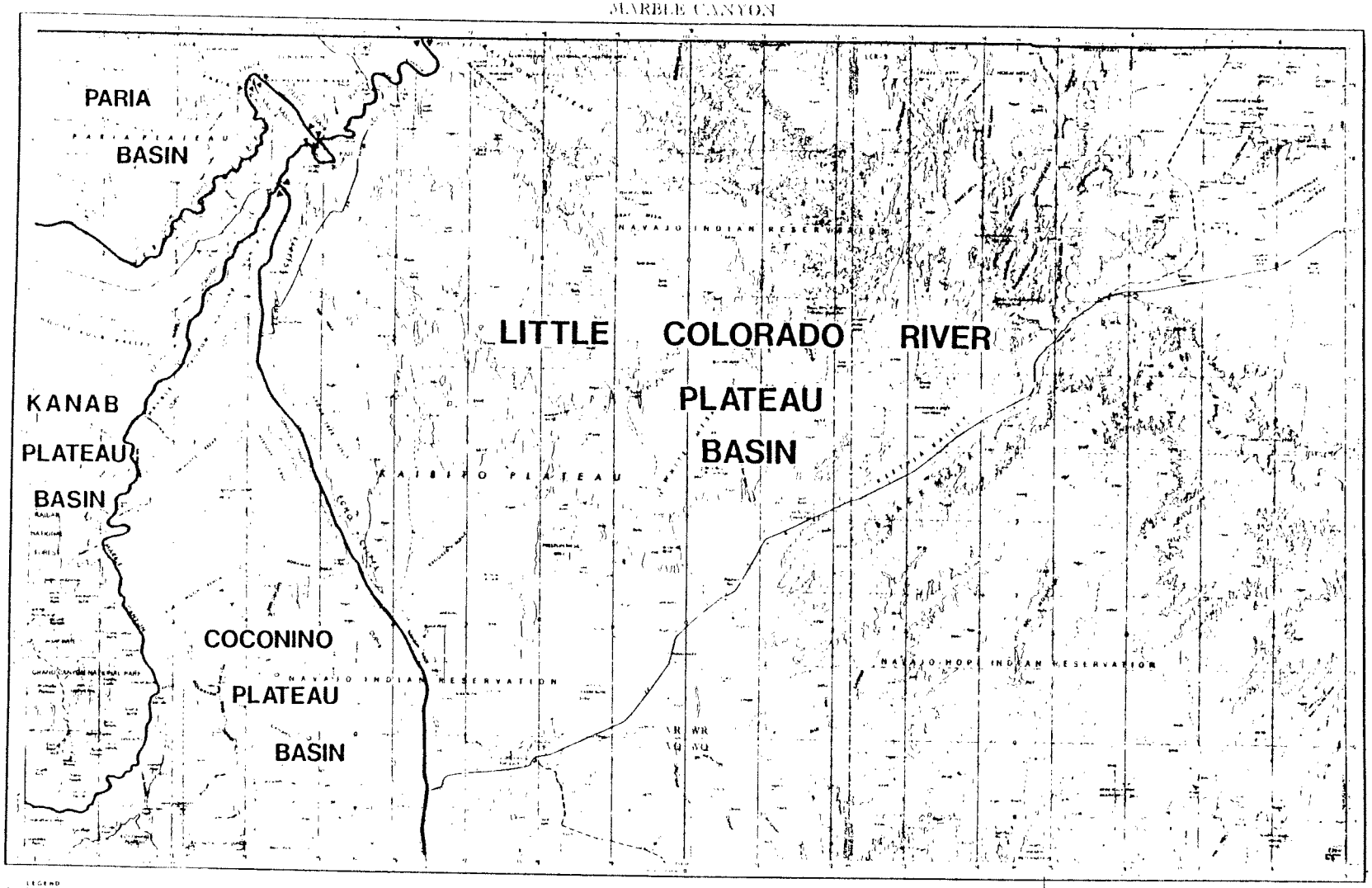

GROUNDWATER BASINS

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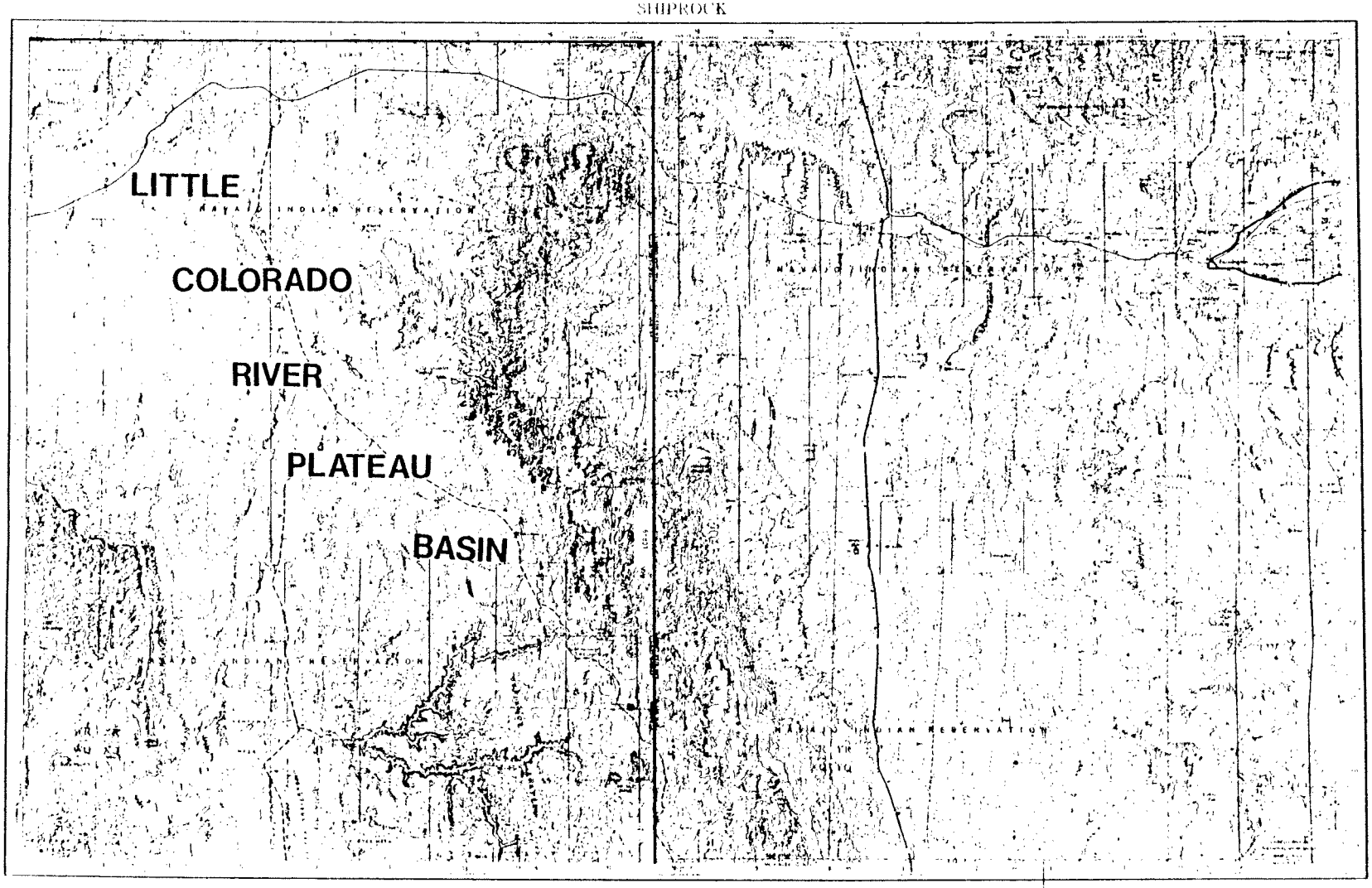
SHIPROCK



LEGEND

BASIN BOUNDARY

SUB-BASIN BOUNDARY

A.M.A. BOUNDARY

COUNTY LINE

I.N.A. BOUNDARY

▼ XXX - N ▼ BOUNDARY LINE SEGMENT DESIGNATOR

BASE MAP U.S.G.S. 1° x 2°

ORIGINAL SCALE 1: 250,000

LOCATION MAP

GROUNDWATER BASINS

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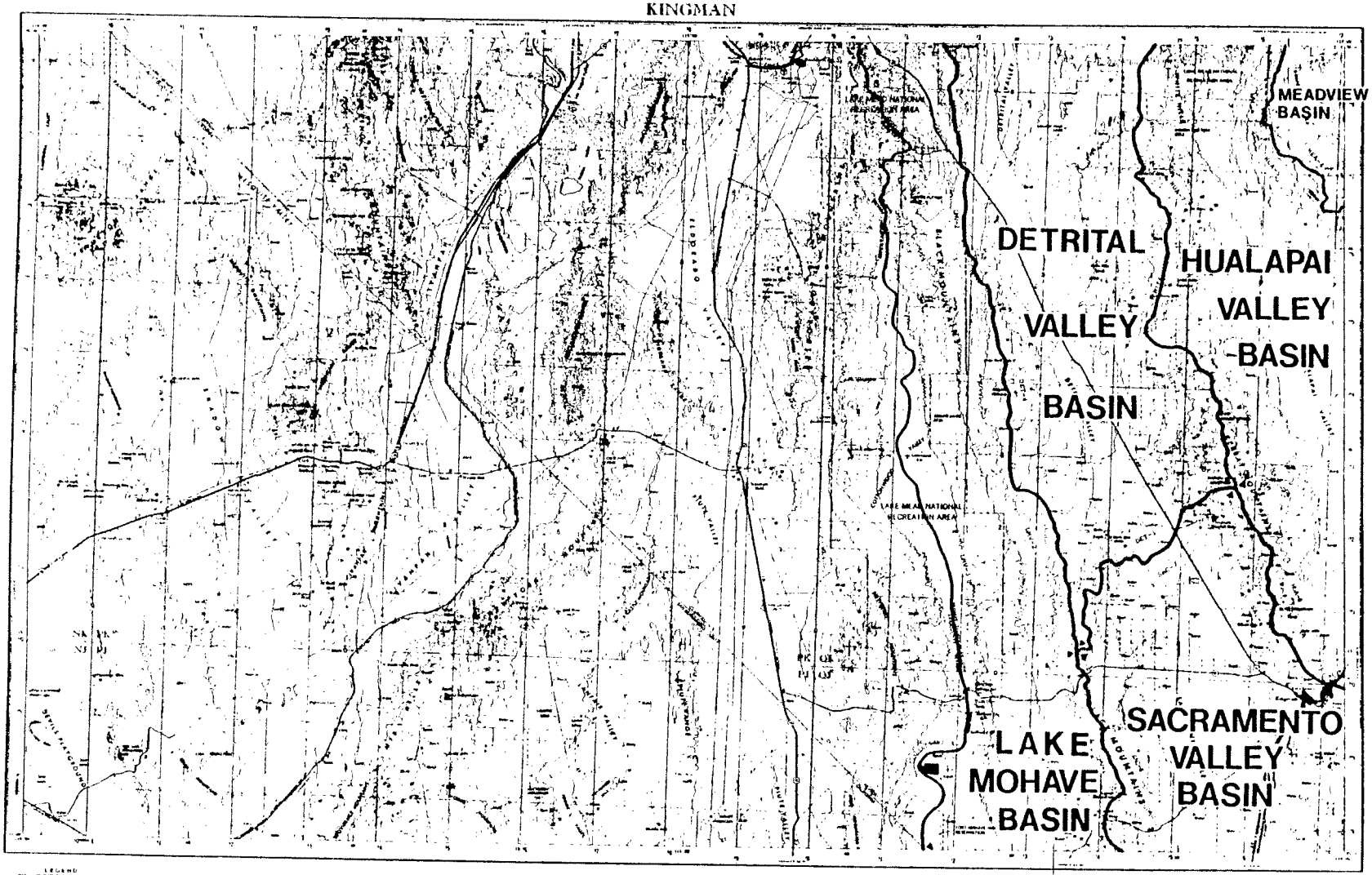

GROUNDWATER BASINS

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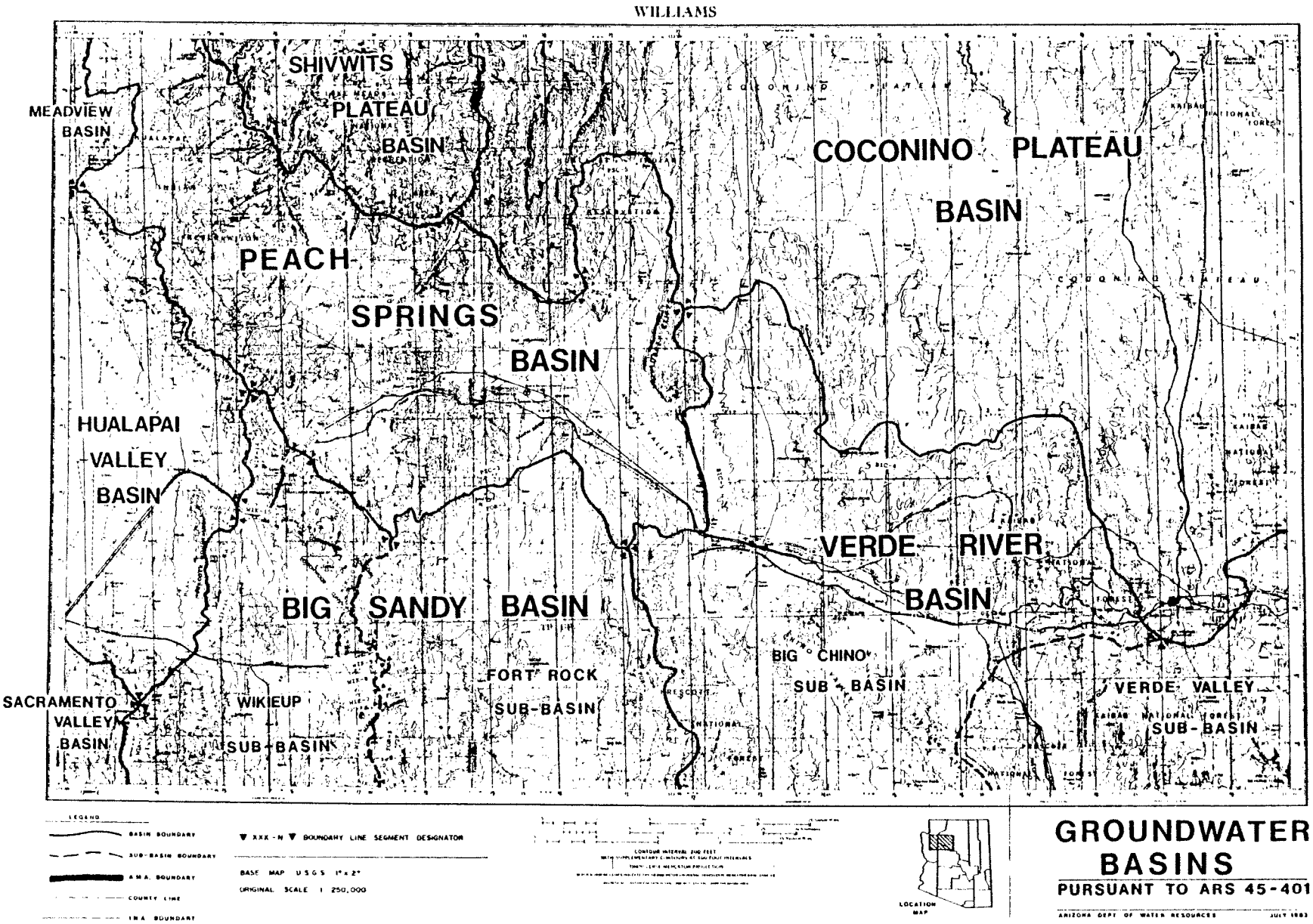

GROUNDWATER BASINS

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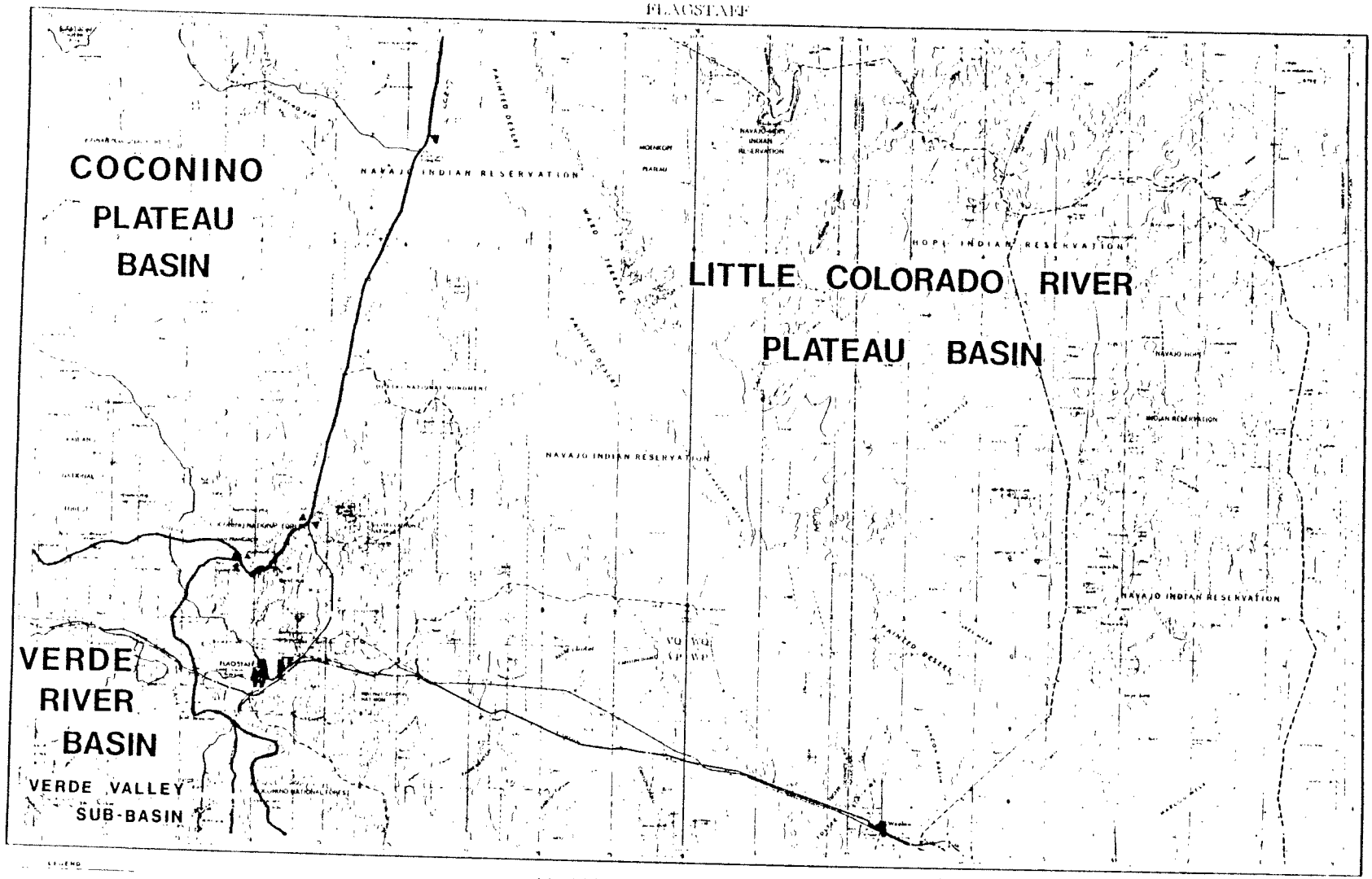

GROUNDWATER BASINS

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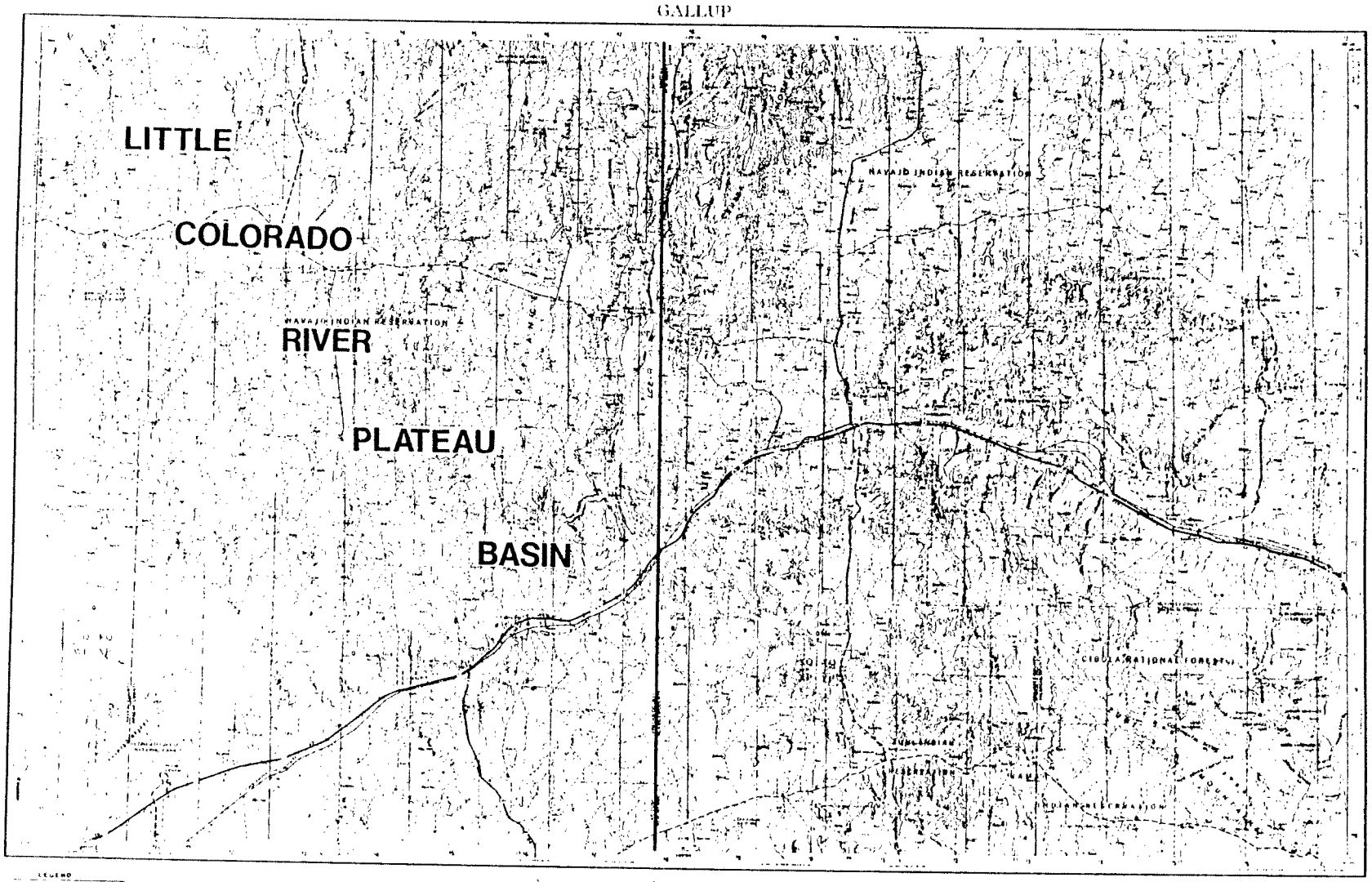
GALLUP
LITTLE
COLORADO
RIVER
PLATEAU
BASIN
NAVAJO INDIAN RESERVATION
NAVAJO INDIAN RESERVATION
CIBOLA NATIONAL FOREST
LEGEND
BASIN BOUNDARY
SUB-BASIN BOUNDARY
AMA BOUNDARY
COUNTY LINE
INA BOUNDARY
▼ XXX-N ▼ BOUNDARY LINE SEGMENT DESIGNATOR
BASE MAP USGS 1°x2°
ORIGINAL SCALE 1:250,000
LOCATION MAP
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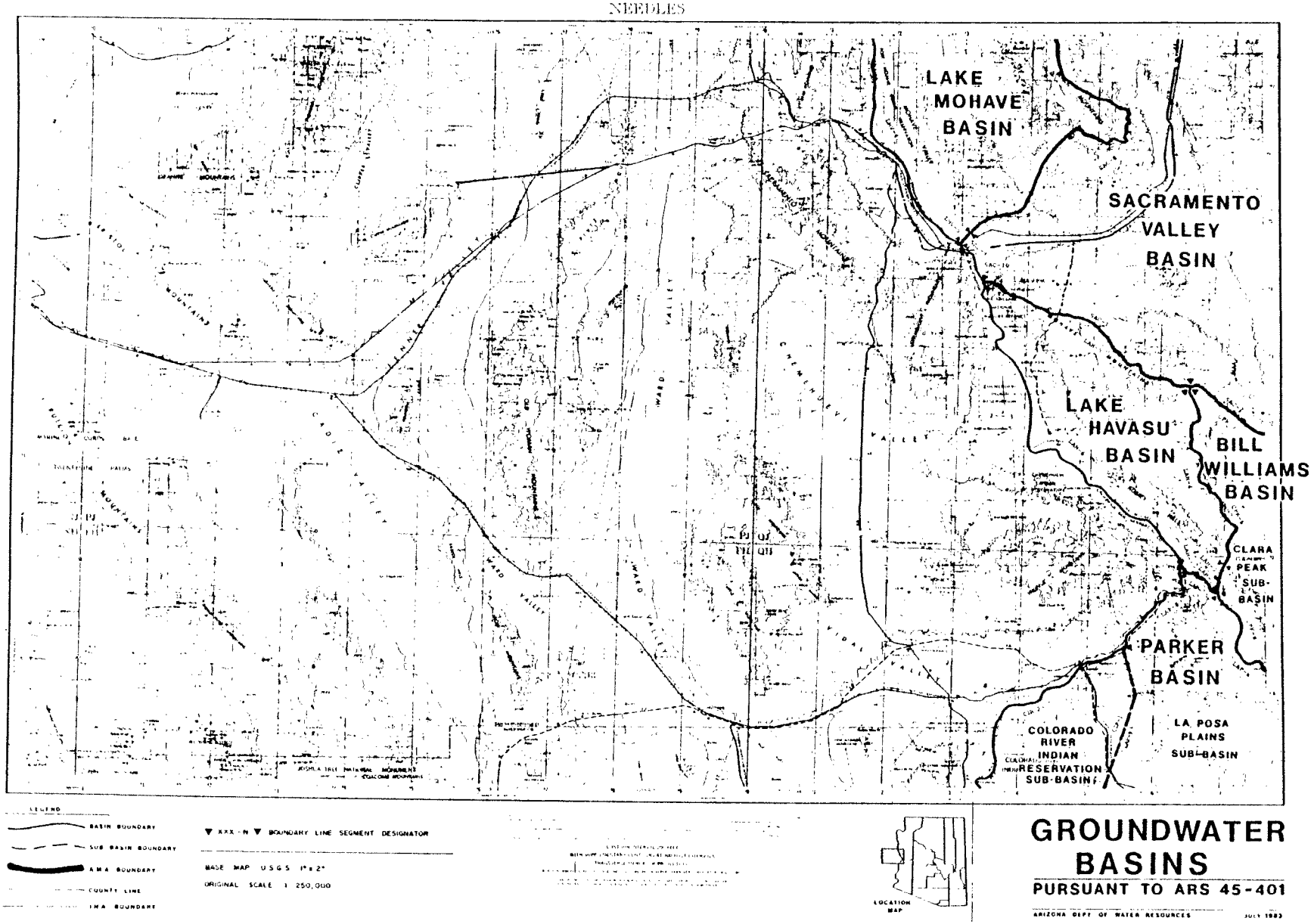

GROUNDWATER BASINS

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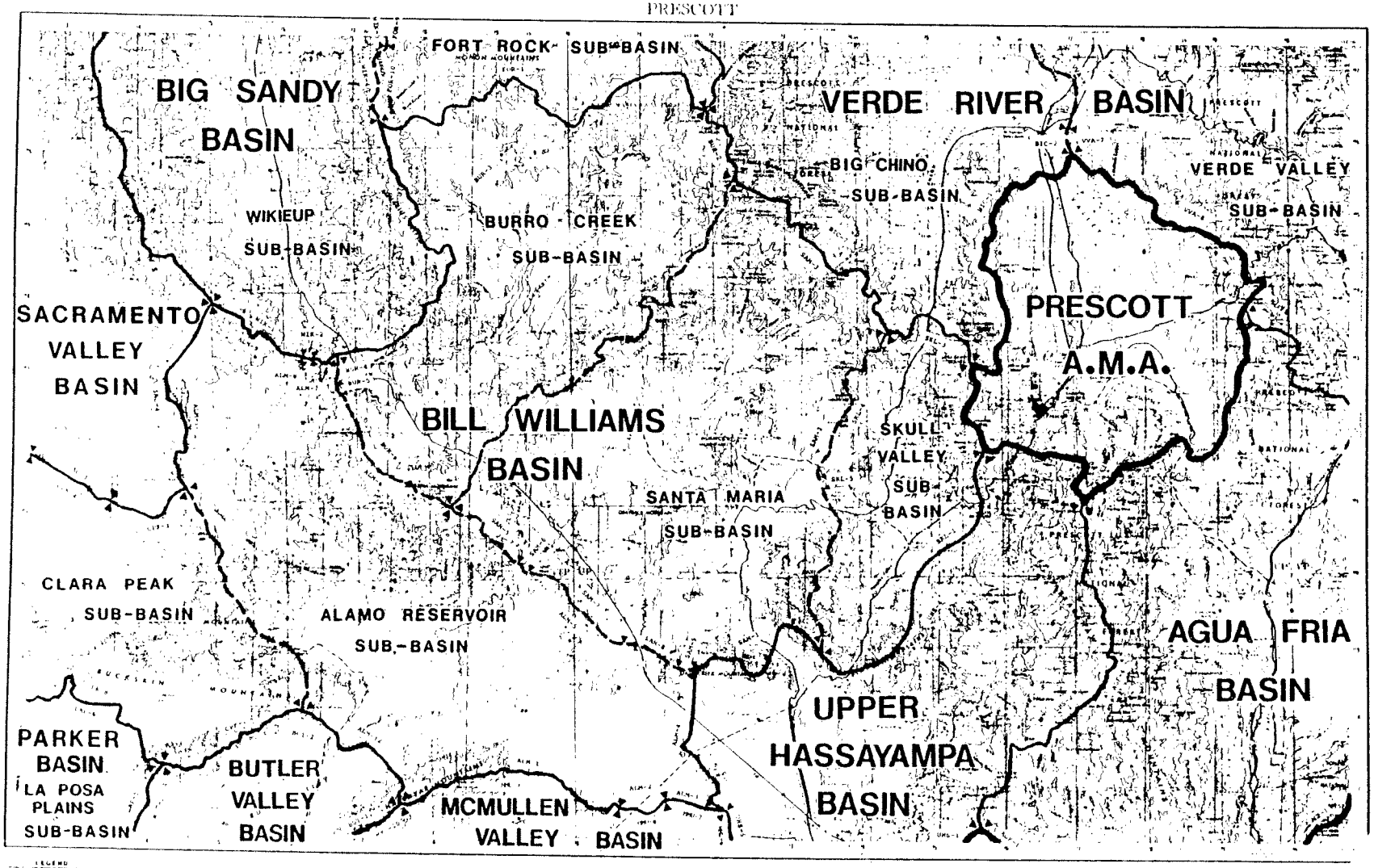

LEGEND

BASIN BOUNDARY

SUB-BASIN BOUNDARY

A.M.A. BOUNDARY

COUNTY LINE

I.M.A. BOUNDARY

▼ XXX-N ▼ BOUNDARY LINE SEGMENT DESIGNATOR

BASE MAP U.S.G.S. 1° x 2°

ORIGINAL SCALE 1:250,000

LOCATION MAP

GROUNDWATER BASINS

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